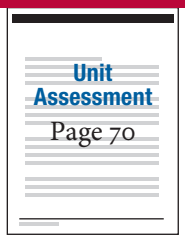
Unit Activity Masters and Visual Aids

Unit Activity Masters

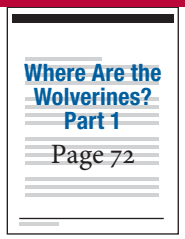
Unit Assessment

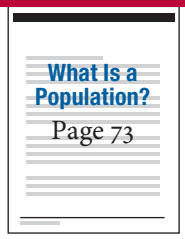
Energy - Pass It On!



Lesson 1

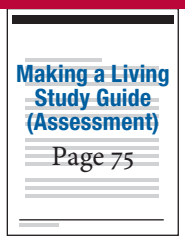
What is a Population?

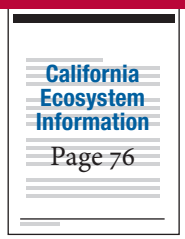




Lesson 2

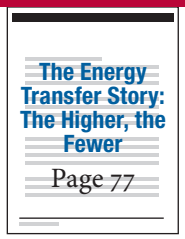
Making a Living

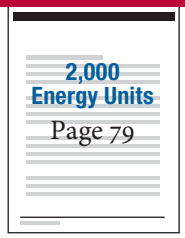


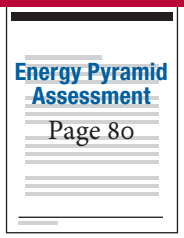


Lesson 3

The Higher, the Fewer







Lesson 4

It is All Connected

No Activity Masters are used in the lesson.

Lesson 5

Cause and Effect?

Cause and Effect Puzzle Pieces Page 81

Where Are the Wolverines? - Part 2 Page 86

Cause and Effect Study Guide Page 87

Lesson 6

Making Choices: The Effects of Human Consumption

Persuasive Essay Self-Evaluation Guide Page 88

Land Use Scenarios Page 89

Persuasive Essay Peer & Teacher Evaluation Guide Page 97

Unit Assessment (Activity Master) *page 1 of 2*

Name: _____

For each multiple choice question, select the letter of the choice that best completes the sentence. Mark your choice in the space at the left. Be sure that your answers are easy to read!

____ 1. An organism that uses the energy of the sun to make its food is called a (an)
a. herbivore b. consumer c. carnivore d. producer

____ 2. Organisms that obtain their energy from foods that they eat are called
a. plants b. consumers c. producers d. trophic levels

____ 3. An animal, such as a deer, that primarily eats plant material is called a (an)
a. omnivore b. producer c. herbivore d. carnivore

____ 4. An animal, such as a lizard, that primarily eats other animals is called a (an)
a. omnivore b. producer c. herbivore d. carnivore

____ 5. An animal that eats both plants and animals is called a (an)
a. omnivore b. producer c. herbivore d. carnivore

____ 6. Organisms, such as bacteria, that obtain their energy by breaking down dead organisms are called
a. producers b. herbivores c. carnivores d. decomposers

____ 7. Animals, such as vultures, that eat dead organisms are called:
a. decomposers b. scavengers c. producers d. herbivores

____ 8. Which of the following would be considered a scientific description of a population?
a. 147 catfish lived in the pond last summer
b. There were now 34 deer.
c. 35 students
d. There are now fewer bears living in the forest.

____ 9. At each trophic level, less energy is available to the organisms than was available to the organisms at the lower trophic level. This is because:
a. Most organisms are wasteful.
b. Organisms use energy in the process of living.
c. Most organisms try to conserve energy.
d. Organisms store energy rather than pass it on.

____ 10. A commonly used estimate of the amount of energy available to the next trophic level in a food chain is about ___%.
a. 1% b. 10% c. 50% d. 75% e. 90%

____ 11. In a food pyramid, which of the following would be considered a primary consumer?
a. bobcat b. bacteria c. vulture d. rabbit

____ 12. In a food pyramid, which of the following would be considered a secondary consumer?
a. mouse b. deer c. worm d. hawk

____ 13. In a food pyramid, humans are
a. producers b. consumers c. scavengers d. decomposers

Unit Assessment (Activity Master) *page 2 of 2*

Essay Questions:

14. Tell how energy from the sun enables a top carnivore such as a mountain lion to live. Show your understanding of the following terms as you use them in your essay:

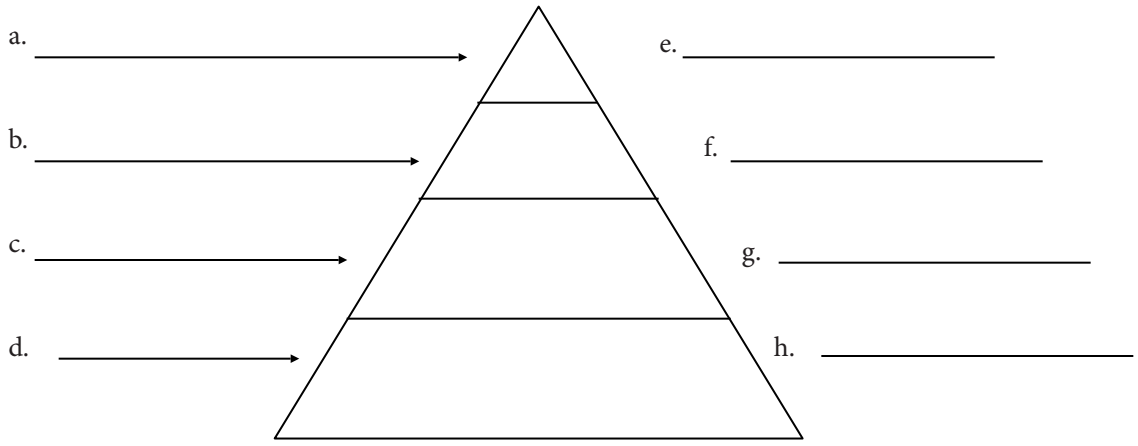
producer **photosynthesis** **consumer** **herbivore** **carnivore**

15. Label the trophic levels of the energy pyramid below. Use the following terms in your labels in the left column: (Some of lines a-d will have more than one term.)

first-level consumer	**producer**
second-level consumer	**herbivore**
third-level consumer	**carnivore**

In the right column, give an example of an organism that is at that trophic level.

level / types of organisms **examples of organisms**



16. If 100,000 units of energy are stored in the grass in the following food chain, how many units of energy would the hawk have?

17. Explain why the hawk has less energy than is found in the grass.

grass → **grasshopper** → **frogs** → **snakes** → **hawks**

18. A city needs to widen the road going through a forest to a nearby lake. Name two parts of the road widening process that could affect the lake and forest ecosystem.

19. Could the widening of the road affect the food/energy pyramid in the lake or in the forest? Explain why or why not.

***Where Are the Wolverines?*—Part 1** (Lesson 1 Activity Master)

Wolverines once roamed the Sierra Nevada Mountains. However, nobody has seen one in California since 1953. Today, most scientists believe the mammal either no longer lives in the state, or is very rare. What happened to California's wolverines?

With thick bushy coats, broad heads, and short furry ears, wolverines look like small black bears. Along with their sharp teeth and claws, they use foul-smelling musk oil to defend themselves. The musk oil makes them smell like a skunk. These features earned the wolverine the nickname of "skunk bear."

Wolverines eat many kinds of foods. Their prey includes hoary marmots, mice, gophers, deer, and pikas. Pikas are small rabbit-like animals that live at high elevations. Wolverines are both carnivores and scavengers. Carnivores kill and eat meat. Scavengers feed on dead animals, also called carrion. Carrion is an especially important part of the wolverine's diet in winter.

Wolverines are about the size of a small collie. They are the largest member of the weasel family. They are also the most ferocious. Wolverines are remarkably strong for their size. They have been known to kill animals as large as a moose. Their powerful jaws and sharp claws make them powerful predators. Their teeth are sharp and strong enough to chew through bone and carrion that has frozen in the snow.

What wolverines lack in size, they make up for with aggressiveness. A large wolverine might weigh only 40 pounds. But it will challenge much larger predators and steal their prey. Hunters and trappers have witnessed 1,000-pound grizzly bears leaving their meals behind when a wolverine approaches.

Wolverines normally live high in the mountains. They usually are found in high open areas where it is too cold and snowy for trees to grow. Wolverines share their habitat with populations of other small- and medium-size mammals, birds, insects, and fungi that they hunt and eat. Other, larger predators like mountain lions, bears, and wolves also live in the same region. These predators compete with wolverines for food.

Wolverines are well adapted to live and hunt in the snow. Their fur is thick and keeps them warm. Their feet are large so they can walk easily on snow. If they are hungry, they can even use their long claws to dig ten feet into the snow to find hibernating animals.

Snow plays a very important role in wolverine survival. Female wolverines raise their babies in dens built in deep snow layers. These dens are long, complex snow tunnels that protect the young from predators and provide warmth in the cold climate. If there is not enough snow, wolverine babies may not survive to adulthood.

Two things help determine the size of the territory each wolverine needs. One is having adequate sources of food. The other is being able to find a suitable place for a den. Wolverines cover many miles in a day of hunting. Each animal needs lots of space to hunt and raise its young. Wolverines fight off other wolverines that try to enter their home territory. This limits the total number of wolverines that might live in a region. It is one of the reasons that wolverines are considered one of the rarest mammals in North America.

While wolverine numbers were never very high, there were enough around in the 1800s that trappers considered them pests. Trappers would lose money when hungry wolverines stole animals from their traps. The trappers used poisoned bait to kill wolverines.

Early settlers reported wolverines stealing food from their cabins. The "skunk bears" sometimes ruined settlers' belongings with their musk and urine marking. Wolverines were considered particularly fierce and dangerous animals. They were often killed when the opportunity arose.

Because wolverines are very secretive and travel across huge ranges, they are hard for scientists to study. Many things about the species are not known. But one thing is sure. Wolverines used to live throughout the higher reaches of the Sierra Nevada Mountains. Now they are exceedingly rare. Their decline is a mystery scientists want to explore.

Name: _____

What Is a Population? (Lesson 1 Activity Master)

You have probably heard the world "population." Even though population is a common word, it has several different meanings, or definitions. In science, it has a specific meaning. By doing this activity, you should:

- learn at least two different meanings of the term population
- learn the scientific meaning of the term population

Use a dictionary to find two meanings of the term "population." Write those meanings below and write sentences that show at least two of those meanings.

The dictionary that I used was:

Title (or URL for an Internet dictionary)

Publisher: city _____ state _____ company _____ date (year) _____

Meanings

A. _____

B. _____

Sentence Showing That Meaning

A. _____

B. _____

2. Now that you know some dictionary definitions of population, find out how some other people would define it. Ask at least two other students and one adult to define population and use it in a sentence.

Student #1

Meaning _____

Sentence _____

Student #1

Meaning _____

Sentence _____

Adult

Meaning _____

Sentence _____

What Is a Population? (Lesson 1 Activity Master) *continued*

3. Look up the word population in your textbook. Write the definition here:

_____

_____

4. List the three parts of the scientific definition of the word population:

A. _____

B. _____

C. _____

Write a sentence that demonstrates your understanding of the scientific meaning of the word "population."

_____

_____

_____

Name: _____

Making a Living Study Guide (Lesson 2 Activity Master)

For this assignment, you will complete a Study Guide that includes information on the organisms and different functions they serve in a particular ecosystem. Your teacher will assign the ecosystem.
You will first need to do some research on the ecosystem that you select to find out what organisms live there and what their roles or functions are. In the space provided, identify the sources of your information.
Identify at least two typical examples of organisms that live in the identified ecosystem representing: producers, consumers (herbivores, carnivores, scavengers and omnivores) and decomposers on the table provided.

My ecosystem type is: _____ (1 point)

Role or Function		Examples of Typical Organisms
Producers		(2 points)
Consumers	Herbivores	(2 points)
	Carnivores	(2 points)
	Scavengers	(2 points)
	Omnivores	(2 points)
Decomposers		(2 points)

Source(s) of information: _____ (2 points)

Questions:

1. What would happen to the consumers if there were no producers? (5 points)

_____

_____

2. What would happen if there were no decomposers? (5 points)

_____

_____

3. Why are people considered to be consumers? (5 points)

_____

_____

California Ecosystem Information (Lesson 2 Activity Master)

Ecosystem	Producers	Representative Consumers				Decomposers
		Herbivores	Carnivores	Omnivores	Scavengers	
Rocky coast	algae, including some plankton	some snails, some plankton, some fish	anemones, sea stars, octopus, some fish	crabs, gulls, some fish	crabs, gulls, some fish	bacteria
Marsh	algae, including some plankton, marsh grasses, cattails	some plankton, snails, ducks, some fish	some snails, egrets, herons, some fish	crabs, gulls, some fish	crabs, gulls, some fish	bacteria, worms
Pond or Lake	algae, aquatic grasses	some plankton, snails, some fish, ducks	some fish, turtles, insects	some fish	crawdads, some insects, some fish	bacteria, worms, fungi
Grassland	grasses, flowers	insects, birds, mice rabbits, gopher, prarie dogs, antelope	insects, birds, gopher snake, lizards, fox, hawk	coyotes, badgers	coyotes, turkey vultures, insects	bacteria, fungi, worms
Desert	cacti, cresote bush, ocotillo	insects, birds, mice, rabbits, kangaroo rats, tortoises	rattlesnake, lizards, roadrunners	coyotes	coyotes, turkey vultures, insects	bacteria, fungi
Chaparral	coyote bush, sage brush, poison oak, grasses	insects, birds, mice, rabbits, deer, quail	rattlesnakes, lizards, foxes, bobcats, mountain lions	coyotes, opossums, skunks	coyote, turkey vultures, insects	bacteria, fungi, worms
Oak woodland	oak trees, grasses, wildflowers	insects, birds, mice, rabbits, deer, squirrels	snakes, lizards, foxes	coyotes, opossums, skunks, bears	coyote, turkey vultures, insects	bacteria, fungi, worms
Coast redwood forest	redwood trees, Douglas-fir trees, poison oak, ferns tanoak, moss	insects, deer, birds, voles, squirrels	foxes, owls, salamanders, newts	opossums, skunks, bears, raccoons	insects, crows	bacteria, fungi, worms
Pine forest	various types of pine trees, Manzanita, shrubs, grasses	insects, deer, birds, squirrels, chipmunks	foxes, owls, bobcats, snakes, lizards	opossums, skunks, bears, raccoons	insects, crows, turkey vultures, coyotes	bacteria, fungi, worms

The Energy Transfer Story: The Higher, the Fewer (Lesson 3 Activity Master)

Narrator (pointing to the "sun"):
Every day, lots of energy comes to the Earth from the sun. That energy can be used for many things such as heating houses and water and generating electricity. However, people and other animals cannot use the sun's energy for life processes such as breathing and growth. Only plants can do that.

Sun (pointing to 10,000 energy units represented by squares on graph paper):
I am the sun. I shine on Earth all day long, sending huge amounts of light energy to the planet's surface. Most of that energy is reflected back into the atmosphere, but pavement and oceans and plants and other things on which my rays fall absorb some of it. But plants are the only things that can use my energy to produce the chemical energy they need to live. The squares on this graph paper represent 10,000 units of light energy from the sun.

Plant (pointing to 100 energy units):
I am a grass plant, a producer, and I am able to absorb and store about 1% of the energy that reaches me from the sun. The rest of the energy from the sun is reflected away. Through photosynthesis, I turn light energy into sugars and starches, which I store in my stem and leaves. This stored energy is my source of food; I use it to live and grow. I am called a producer because I make food out of the sun's energy. Plants are the start of most every food chain on Earth. We are called the first trophic level. These squares represent 100 units of energy, which is only 1% of the light energy that reached me from the sun.

Narrator:
Plants store the chemical energy in sugars and starches for their own use. Sometimes, though, a plant is eaten by an herbivore such as a rabbit and that food energy is transferred.

Rabbit (pointing to 10 squares):
I am rabbit. I eat plants, so I am an herbivore. Sometimes I am called the first consumer or first level consumer. Herbivores form the second trophic level, or the second step in a food chain. I use most of the energy that I consume just to stay alive—to move, hunt for food, escape enemies, find shelter, build my body, and other life processes. Only about 10% of the energy that I take in is available to whatever might eat me.

Narrator:
And there are many things that like to eat rabbits! As you know, meat eaters are called carnivores.

Coyote (pointing to 1 square):
I am a coyote, and I am a carnivore. Since I eat first level consumers such as rabbits, I am sometimes called the secondary consumer or the second level consumer. Like all consumers, I use most of my energy just to live. I need energy to hunt for and catch my food, or dig a burrow for my den. Why, I use energy just to breathe, digest my food, and to keep my heart beating! Only about 10% of the energy that I take in is available to whatever might eat me.

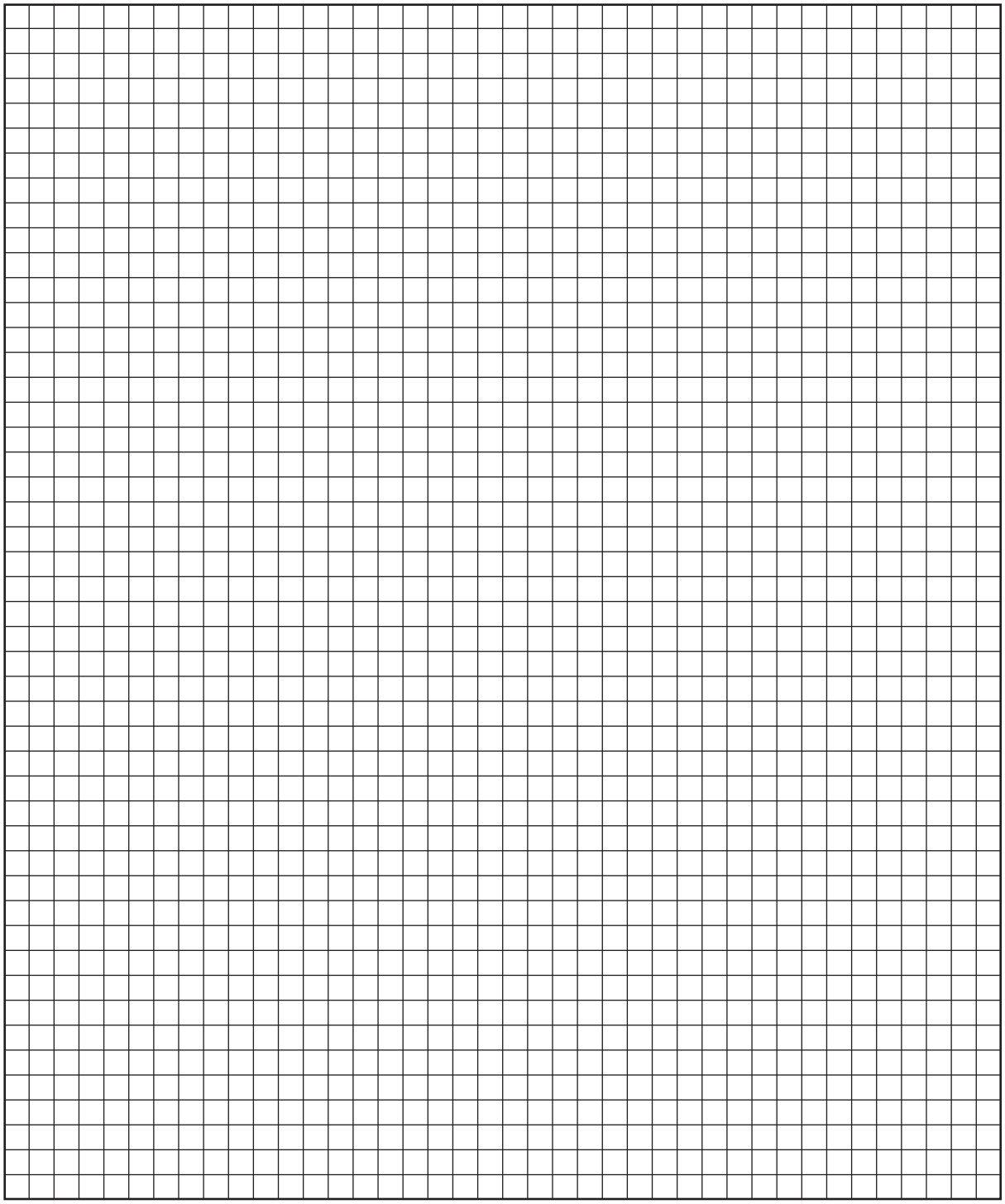
The Energy Transfer Story: The Higher, the Fewer (Lesson 3 Activity Master) *continued*

Narrator:
Depending on the food chain, another carnivore, such as a mountain lion or wolverine, might eat the first level carnivore. Another example of this is one fish eating a smaller fish, or a snake eating a frog. Sometimes the first carnivore dies and is eaten by a scavenger, or its body is used by decomposers such as fungi and bacteria.

Mountain lion (pointing to the mountain lion unit of energy 0.1 square):
I am a mountain lion, and I will eat almost anything! I will even eat a coyote if I find one! Like all of the other organisms in this food chain, I use most of the energy that I take in just to stay alive! Whether I am a mountain lion eating a coyote, an eagle eating a fox, a crab eating a dead fish, or a million bacteria decomposing a dead bear, I can only capture about 10% of the energy in my food!

Narrator:
So we see that only a tiny fraction of the energy that comes from the sun is stored in plants. Plants use that energy for photosynthesis to produce sugars and starches. In addition, when consumers feed on plants or other consumers, they only capture about one tenth of the energy in their food. And that is why it takes so many plants to support one wolverine, eagle, salmon, or human being!

2,000 Energy Units (Lesson 3 Activity Master)



- Mountain lion unit of energy

Name: _____

Energy Pyramid Assessment (Lesson 3 Activity Master)

Use the Word Bank below to complete the sentences in Questions 1-7: (14 points)

Word Bank

consumer	producer	tertiary consumer
energy pyramid	secondary consumer	trophic level
primary consumer		

1. An organism that obtains energy and materials by eating other organisms: _____

2. Third consumer in a food chain; an organism that feeds on a secondary consumer: _____

3. An organism such as a plant or alga that uses light energy or chemical energy to produce food (sugar) from inorganic chemicals: _____

4. The second consumer in a food chain; an organism that feeds on a primary consumer or herbivore: _____

5. A step in a food chain or food web; producers are the first level, herbivores the second, carnivores that feed on herbivores are the third, and so forth: _____

6. In a food chain, the first consumer; an herbivore: _____

7. A model that shows that about 90% of the energy in organisms at a given trophic level is lost as the organisms are consumed by organisms at the next trophic level: _____

8. Draw the energy pyramid including: grass, rabbit, coyote, and mountain lion. Label each by their function: producers, primary, secondary, and tertiary consumers. And, label the three tropic levels; (6 points)

Cause and Effect Puzzle Pieces (Lesson 5 Activity Master)

Puzzle Piece 1: Loss of Prey

Could loss of prey be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

Wolverines are carnivores. They eat other animals, whether those animals are dead or alive. Deer, mice, gophers, marmots, and picas are among the prey species that wolverines eat. If anything causes the numbers of prey species to go down, wolverines might go hungry. If wolverines cannot get enough to eat, their numbers will go down too. Scientists do not know very much about the numbers of marmots and picas. These animals live at high elevations where it is hard to study their population size. However, it is unlikely that people's actions have affected marmots and picas much. Little has been built in these high areas—just a few roads and ski resorts. There is still a lot of marmot and pica habitat in the region.

Wolverines killed and ate many deer. Early settlers in the Sierra also killed and ate many deer. This could reduce the wolverine's food supply. However, the settlers also cleared forests for lumber, ranching, and farming. This created more of the open habitat that deer prefer. This would help keep the number of deer high. The settlers also killed mountain lions and bears. These animals also ate deer. Reducing their numbers made it easier for wolverines to find deer.

Overall, the number of deer probably did not change much as people settled in the Sierra Mountains.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think loss of prey led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 2: Killing as Pests

Could killing wolverines because they were pests be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

Wolverines look a little like small bears. They are quite fearless and ferocious. Many people were afraid of them. When wolverines came around houses, they sometimes got into fights with people's pets. People who saw wolverines were sometimes scared enough to shoot them. Some people believed wolverines were a threat. They could also be a pest. Some wolverines even broke into people's cabins to find food.

Most wolverines lived high in the mountains. Few people lived in these areas. Therefore, the number of wolverines killed because they bothered people was probably small. However, the total number of wolverines was never very large. Killing even a few could affect the overall population size.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think killing wolverines because they were pests led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 3: Change in Snowfall

Could a change in the amount of snowfall be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

Wolverines need snow. They live high in the mountains where there is usually plenty of snow. Wolverines have large feet so they can walk easily on snow. They are better able to hunt in the snow than many other carnivores. Therefore, they face less competition for food at these high, snowy elevations.

Female wolverines build tunnels in deep snow banks to create their dens. The long, complex tunnels protect baby wolverines from predators. The thick snow walls also provide warmth in the cold climate. If there is not enough snow, wolverines babies may not survive to adulthood.

Low snowfall might also mean less water for plants. This might create food shortages for herbivores, which, in turn, could make it hard for wolverines to find food.

Did these conditions exist during the past 150 years? Scientists studied weather records to see if there were periods of time when lack of snow might have affected wolverines or their prey species. Snowfall records for the high Sierra are not complete. However, the average snowfall has not changed very much.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think lack of snowfall led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 4: Poisoning by Trappers

Could poisoning by trappers be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

Fur trappers worked throughout the Sierra Nevada Mountains in the 1800s and early 1900s. They laid traps to capture beavers, ermine, foxes, and other animals with rich coats. Trappers made their living selling the furs. People used furs for clothing, blankets, and more.

The trapped animals made for easy prey. Wolverines often raided traps, stealing and eating the trappers' income. Of course, trappers were not happy when this happened. They sometimes put out poisoned bait for the wolverines. Trappers killed relatively high numbers of wolverines in this manner.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think poisoning by trappers led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 5: Logging Trees for Lumber

Could logging be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

In the past 150 years, California's population has grown. As the human population grows, people must build more and more houses and other buildings. This requires a lot of lumber.

During the Gold Rush in the mid 1800s, many thousands of people came to the California. Logging increased rapidly in the Sierra Nevada Mountains. By 1880, loggers had cut over 1.5 million acres of pine forests. Many species of wildlife lost their habitats.

Wolverines lived high up in the mountains. In these regions, there is a lot of snow but not much water. The soil is not very deep, and winter storms are severe. Therefore, the few trees do not grow very large. Loggers preferred to work at lower elevations where the forests are full of large trees.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think logging led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 6: Increase in Human Population

Could the increase in human population be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

Food is scarce in the high elevations where wolverines live. Wolverines must range over many square miles to find enough food. This is especially true when they have young to feed. Wolverines are also very choosy about where they build their dens. Conditions need to be just right. Therefore, wolverines maintain large home territories. They protect their territories and fight off other wolverines that try to move in.

Starting during the Gold Rush in the middle of the 1800s, more people moved into the Sierra Nevada Mountains. The human population nearly doubled between 1860 and 1960. People built homes, ranches, roads, and towns in areas where wolverines lived.

It is hard for people and wolverines to live in the same place. As human communities grew, there was less open land for wolverines. Some wolverines were forced out of their home territories. They tried to move to neighboring areas, but existing wolverines often fought them off. There were fewer and fewer places where wolverines could survive.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think the increase in human population led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 7: Killing to Protect Sheep

Could killing wolverines to protect sheep be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

Sheep ranching was common in the Sierra Nevada Mountains in the 1800s and 1900s. During summers, sheep ranchers moved their flocks to high elevations. At this time of year, the snow had melted. There was plenty of grass for the sheep to eat.

The slow-moving sheep were easy prey for the wolverines, coyotes, and other predators that lived in these higher areas. They were easier to catch than deer. To protect their flocks, sheep ranchers put out poisoned bait for the carnivores that attacked their sheep.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think killing wolverines to protect sheep led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 8: Building Roads

Could building roads be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

As settlers arrived in the Sierra Nevada Mountains, they built more roads. The roads made it easier for people to get to and move around the area. At first, people used the roads on foot, on horseback, or in stagecoaches. Later, people in cars and trucks used the roads. The roads continued to grow in size and number. Eventually, people could drive high into the Sierras and across the mountains from California to Nevada.

As people built more roads, it became easier to settle in and develop the region. Towns, recreational developments, mining areas, and sheep ranches increased in number.

Building roads broke wolverines' large territories into smaller pieces. This made it harder for wolverines to find food and good sites for dens. Because there were more people in the area, wolverines and people had more interaction. This was not always good news for the wolverines. Cars and trucks also brought noise and air pollution to the mountains.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think building roads led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 9: Ski Resorts

Could building ski resorts be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

People generally build ski resorts high in the mountains, which is where wolverines lived. To make ski runs, people must clear trees from wide areas of the mountainside. They also build ski lifts and lodges. During ski season, thousands of people are on the slopes. They travel to the area by car, bringing air pollution to the mountains. Many vehicles move around the mountains to maintain the slopes and related facilities.
Ski resorts break wolverines' large territories into smaller pieces. This makes it hard for the animals to find food and good sites for dens. Ski resorts also bring many people into the wolverines' environment. The people come during winter, which is an especially difficult time of year for most predators. Food is scarce because prey species often move to warmer areas or hibernate deep under the snow.
With more people in the area, wolverines and people are likely to have more interaction. This is not always good news for the wolverines.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think building ski resorts led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

Puzzle Piece 10: Mining

Could mining be the reason for the overall decline of the wolverine population in the Sierra Nevada Mountains?

The California Gold Rush brought many miners to the Sierra Nevada Mountains. Most miners worked in the lower areas of the Sierra Nevada Mountains. Although it did occur, mining was not very common at the higher elevations where wolverines lived.
Miners used several different methods to find gold. In some cases, they used huge water cannons to wash away hillsides to get at the gold. This method is called hydraulic mining. Hydraulic mining eroded the soil, or washed it into streams and rivers. Sometimes, the build up of soil actually changed the path of the streams. Areas where salmon and other fish laid their eggs were ruined. Hydraulic mining affected many kinds of plants and animals.
Another method of mining used poisonous chemicals to remove gold from rocks. These poisons could end up in waterways and soil. Some mining methods used explosives and were very noisy.
Mining operations brought many changes to the habitat. The mines also brought many people. With the people came settlements, roads, and in later years cars, trucks, and heavy equipment. Most of this mining in the Sierra occurred at mid- and lower elevations. All of these changes in the environment made it difficult for plants and animals to survive in the areas where mining was widespread.

Your group will need to present the information in this piece of the wolverine puzzle to the rest of the class. Use your own words; do not read the card aloud to the class. Do you think mining led to the overall decline in the wolverine population? Decide yes or no, and be prepared to explain your thinking.

***Where Are the Wolverines?*—Part 2** (Lesson 5 Activity Master)

Wolverines no longer live in California. Scientists set out to explore why. Since wolverines need snow for their dens, a drop in snow levels could explain the disappearance. A decline in population of their prey species might also explain the lack of wolverines. So scientists studied weather patterns and prey populations over the past 150 years. The studies showed that climate and prey populations have not changed much. Food shortages and lack of snow did not cause the decline of the wolverine.

What has changed over the past 150 years? For one thing, the ways people use the land have changed a lot. The discovery of gold at Sutter's Mill in 1848 began a major shift in the region. Is this what caused the wolverine to vanish?

After the Gold Rush started, miners and early settlers built many new towns in the Sierra Nevada Mountains. In 1860, about 150,000 people lived in the region. By 1960, that number grew to around 275,000. The population reached 650,000 in 1990 and will soon pass 1,000,000.

The Gold Rush paved the way for many new industries. In lower elevations, forests were cut to provide lumber for mines and houses. By 1880, over 1.5 million acres of pine forests had been cleared. Different kinds of trees grow at higher elevations. The lumber from these trees is not as good for building, so there was not as much logging in the areas where wolverines generally lived.

Gold Rush mining practices caused huge amounts of soil to wash into in mountain streams. This changed the ways the rivers flowed. Farmers also used a lot of water. They took it from streams to water, or irrigate, their crops. In fact, they used more land for farming and ranching in 1860 than in any year since. Irrigation projects continued to grow until the 1920s. They have leveled off since then.

Cattle grazing was common at lower elevations. In the higher grasslands where wolverines lived, ranchers grazed sheep. This practice cleared huge areas of native grasses in the late 1800s. Ranchers worried about wolverines that hunted and killed their livestock. Like trappers, they also poisoned wolverines when they became a threat to the ranchers' income.

Parks were created at Yosemite Valley and Calaveras Big Trees in the 1860s. These were the first parks in the Sierra Nevada Mountains. More parks followed. Tourism brought more people to the area. More people meant more contact with wolverines. Some people were afraid of wolverines and sometimes killed them to protect themselves.

The development of mining, grazing, farming, logging, and recreation all affected the habitat of the wolverine. Finding places to build dens and raise young became difficult. The predators no longer had unbroken home ranges in which to hunt. As their habitat changed, the numbers of some prey species, like the pika, also decreased. Hunters killed deer, reducing an important winter food source for the wolverines. It grew harder and harder for the wolverine to survive in the Sierra Nevada Mountains.

The mystery is solved. No one thing caused wolverines to disappear from California's mountains. A combination of factors contributed to their decline.

Name: _____

Cause and Effect Study Guide (Lesson 5 Activity Master)

1. Describe how each of the following activities might have contributed to the decline of the population of the wolverines and how each might benefit people?
Example:

Activity	Possible Contribution to the Decline of Wolvertine	Potential Benefits to People
Deer hunting		
Highways connecting California and Nevada		
Logging		
Mining for gold		
Wearing wool clothing		

2. Human activities like logging and building roads influence natural systems. Provide two examples of how logging and building roads influence natural systems. Provide two examples of how people benefit from logging and building roads. (1 point per answer) (1 point per answer)

3. Logging in the Sierra increased at the same time the wolverine population decreased. Does this prove that the logging caused the decline of the wolverine; that is, was this a cause-and-effect relationship? Why or why not? (2 points)

4. Describe two effects of human practices that change how energy moves through natural systems. (2 points)

Name: _____

Persuasive Essay Self-Evaluation (Lesson 6 Activity Master)

Does the essay:	Self Evaluation
Have an interesting headline?	Yes ____ No ____
Provide a description of the purposed land use change?	Yes ____ No ____
Identify what resources would be affected and the quantities affected?	Yes ____ No ____
Identify what populations of organisms would be affected and how?	Yes ____ No ____
Describe why those organisms are important to the energy flow in the natural ecosystem?	Yes ____ No ____
Identify the function of the affected organisms in the ecosystem?	Yes ____ No ____
Clearly state a position, either for or against the proposed change?	Yes ____ No ____
Explain why people should agree with your position?	Yes ____ No ____
Include any quotations or realistic details, and did they add to the article?	Yes ____ No ____
Did you check the essay for:	
Grammar, word use, punctuation, spelling?	Yes ____ No ____
Overall apparent effort and neatness?	Yes ____ No ____
Did you check the article for:	
	Yes ____ No ____

Land Use Scenarios (Lesson 6 Activity Master)

JOHN MUIR WOLVERINE PRESERVE

What Is There Now
This land is in a national forest. It was logged in the 1950s. Now, a large ponderosa pine forest is growing there. There is also oak woodland and chaparral. Wolverines lived in this area before 1920. No wolverines have been seen there since then. However, there are large populations of deer, bears, coyotes, and other animals in the area. The area will soon be ready for more logging. Many people are looking forward to the jobs the logging will provide.

The Proposed Change
The federal government wants to turn this land into a wildlife preserve. No logging, hunting, or motorized vehicles would be allowed. The main goal is to bring wolverines back to California. Scientists will trap five male and five female wolverines in Michigan. They will release the wolverines in the preserve. The scientists will study the wolverines and try to help them survive.

Some Points in Favor of the Proposed Change
Wolverines used to live in this area of California. It is natural that they live here. Human actions led to the disappearance of wolverines from the area. People have the responsibility to bring them back. This forest offers the right habitat for wolverines. There is a good food supply.

Some Points Against the Proposed Change
This is a large area of beautiful forest. People use this land in many different ways. Many families hike there. Mountain bikers enjoy the trails. Hunters use the area too. The trees are an important source of lumber. Logging offers good jobs for people in this area. Wolverines have not lived here for almost 100 years. Locking up this much good forest for 10 animals is a waste of land.

PINE CITY MOUNTAIN PARK

What Is There Now
Mr. and Mrs. Smith own 100 acres of land near Pine City. Pine City is in the Sierra Nevada Mountains. The Smiths bought the land 50 years ago. The land is mostly pine forest. There are large mature trees that could be valuable for lumber. The Old Pine River flows through the property. Many kinds of forest plants and animals live in the area, including deer, bears, foxes, and trout. Some people claim to have seen wolverines in the area many years ago.

The Proposed Change
The Smiths need money for their retirement. They want to sell 90 acres of their pine forest. They would like to sell the land to Pine City for a park. However, Pine Mountain Resource Company is offering to pay more for the land than Pine City can afford. Pine Mountain Resource Company wants to cut down the trees and sell the lumber. They will replant it with a new crop of trees to harvest in another 40 or 50 years.

Some Points in Favor of the Proposed Change
If Pine City buys the land, everyone in town can use the park. Residents will have a place to go for camping, hiking, rafting, and fishing. Tourists will also come to use the park. Area stores and restaurants will get more business from the tourists.

Some Points Against the Proposed Change
Purchasing this land will cost the city a lot of money. In addition, the city will have to pay to develop and maintain the park. The city will have to charge to use the park. People may not be able to afford to visit. Lumber is a valuable resource, and there is great demand for wood. If Pine Mountain Resource Company buys the land, harvesting the lumber will provide jobs and tax money for the city, county, and state.

BIG LAKE COUNTY PARK

What Is There Now
People use the Big Lake National Forest in many ways. Half the area has been logged over the past 100 years. There are large Douglas fir and pine trees growing there now. The Family Forest Resource Company is planning to hire loggers to cut down some of these trees soon. The forest is popular with deer hunters, backpackers, off-road vehicle users, and horseback riders. Deer, coyotes, mountain lions, marmots, squirrels, and many other animals live there. There are many miles of rivers, streams, and logging roads.

The Proposed Change
The government of Big Lake County wants to buy part of the national forest. They want to create a park. Visitors to the park could go backpacking, fishing, and horseback riding. The county will not allow off-road vehicles, hunting, or logging within park borders.

Some Points in Favor of the Proposed Change
Big Lake County is a beautiful area. Many people are moving into the area. There are many new housing developments. The new residents like having places to hike and camp nearby. However, complaints about noise and soil erosion caused by off-road vehicles have increased. Many of the people living in the area think of the national forest as a park. Very few are hunters. Most do not like the idea of tourists coming in to shoot deer in their park.

Some Points Against the Proposed Change
Many people have lived and worked in Big Lake County for a long time. They depend on jobs and taxes provided by the logging industry. Many work for the Family Forest Resource Company. Some people will lose their jobs if the park is created. Many long-term residents enjoy off-road driving and hunting in the national forest. There are already other parks in the county. Maintaining another park would cost tax money. These funds would be better spent on other community issues.

DESERT DUNES WILDERNESS AREA

What Is There Now
There are sand dunes in Rocky Basin National Forest. The dunes are a popular place for off-road vehicles. Bird watchers, photographers, and campers also visit often. Many desert animals live in the area. These include coyotes, desert tortoises, rattlesnakes, desert foxes, and roadrunners. There were active gold mines in the early 1900s. Now the mines are closed, although the buildings are still there. New technology could make it possible to find more gold. The value of gold is rising, so some people want to start mining again.

The Proposed Change
Environmental organizations want to protect the dunes. They want to create the Desert Dunes Wilderness Area. No off-road vehicles or mining would be allowed in this area. The rest of the national forest would remain open for use.

Some Points in Favor of the Proposed Change
Off-road vehicles threaten some of the endangered species that live in the dunes. Three species of concern are the desert tortoise, the fringe-toed lizard, and Parish's daisy. Without protection, these plants and animals might become extinct. Desert soil is fragile. Off-road vehicles and campers' cars and trucks damage the soil. So does mining. This damage looks ugly and harms the desert ecosystem. It ruins the area for backpackers, bird watchers, and photographers. There are not many healthy desert ecosystems left in California. People should protect this one.

Some Points Against the Proposed Change
Off-road vehicle driving is a very popular hobby that supports the economy. People who enjoy this hobby need places to go. The national forest dunes are some of the best in Southern California for this sport. Everyone should be able to enjoy the forest. Closing the area to vehicles prevents people from visiting. It would be hard for the elderly, families with young children, and disabled people to get to the dunes. Opening the gold mines would bring jobs and tax money to the local economy.

EAGLE CREEK WATERSHED TIMBER SALE

What Is There Now
The Eagle Creek watershed is part of the North Coast National Forest. The lower part of the watershed includes land that was logged about 75 years ago. There are now many large trees growing there. These trees are valuable for lumber. In the upper part of the watershed, the forest is an old growth forest. This means there was never logging in that area. The trees are very old and very large. People have not changed this ecosystem much. Deer, bobcats, black bears, and trout are common in Eagle Creek watershed. Some backpackers think there may even be wolverines living in the area.

The Proposed Change
The California Timber Company wants to cut down trees in the watershed. The company would sell the trees for lumber. It will pay the U.S. Forest Service for the rights to log the land. California Timber Company will cut select trees from the forest. Some will be old growth trees. They will not clear the land completely.

Some Points in Favor of the Proposed Change
Californians use a lot of lumber every year. They need lumber to build houses, offices, schools, and community centers. The California Timber Company will help meet that need. The company says it can cut the trees without harming the natural environment. They will plant trees to replace the ones they cut. The U.S. Forest Service manages the North Coast National Forest carefully. Even with past logging, the area is home to many kinds of animals. The local towns will benefit from new jobs. Logging can help prevent forest fires. When a company logs, they remove many dead trees and branches from the area. Right now, these branches are a fire hazard.

Some Points Against the Proposed Change
There is very little old growth forest left in California. Several kinds of plants and animals can only live in old growth forests. Wolverines are one of these animals. The wolverine is one of the rarest mammals in California. If wolverines do live in this forest, it is very important to protect the habitat from logging. People need lumber, but they can cut trees from areas like the lower watershed. Logging has already affected the natural systems there.

DESERT SKY HOMES

What Is There Now
For 90 years, the Acme Mining Corporation has owned a lot of desert land in southern California. The company used to work mines there, but the mines closed many years ago. Now the desert land is home to many kinds of plants and animals. Desert tortoises and many desert plants live there.

The Proposed Change
The Acme Mining Corporation wants to build on the land they own. They plan to build 500 houses and a small shopping center. The company already owns the land. Therefore, they can afford to sell the houses at relatively low prices. The company expects many people who work in cities about 45 minutes away to buy the homes.

Some Points in Favor of the Proposed Change
There is not enough low-cost housing in California. Many families cannot afford to buy a house. Acme Mining Corporation can provide 500 families with homes. No one uses this land right now. The project will provide many jobs. Building houses there is good for Acme, good for families, and good for the economy.

Some Points Against the Proposed Change
Five hundred families means about 2,000 people. Two thousand people need a lot of water for cooking, bathing, and watering lawns. However, there is not a lot of water in the desert. It would cost a lot of money to bring enough water to this area. It would also change the habitat entirely. People will have to drive to the city to work. Commuting uses a lot of gasoline and causes air pollution. It would use fewer resources to build low-cost family housing closer to the city.

ALLIED GRAINS RICE FARM EXPANSION

What Is There Now
The Silver River runs through the fields of central California. In winter and spring, the river often floods. This turns the fields into wetlands. During these rainy seasons, many ducks and geese feed in these wetlands. Three species—the Silver River buttercup, the blue watercress, and the red-spotted frog—live only here. They are not found anywhere else on Earth. Farmers grow rice on some of the nearby land.
Bob Williams owns the land. It has been in his family for generations. Long ago, they built levees to keep the river from flooding the land. Now, the levees are broken down and the fields flood each year.

The Proposed Change
Allied Grains Corporation wants to purchase the land from Bob Williams. The large farming company plans to rebuild the levees. The levees will prevent the fields from flooding. They will plant rice, as in some of the neighboring fields.

Some Points in Favor of the Proposed Change
This land is not being used productively. Planting rice will make the land useful. California has some of the best rice-growing fields in the world. Rice farmers can work with conservationists to harvest their crop in fall and flood their fields for winter waterfowl. This has been very successful in some areas.

Some Points Against the Proposed Change
Allied Grains' levees will stop the natural flooding of this land. This will affect all the wildlife in the area. It will be very hard on the ducks and geese that depend on the wetlands in winter. The rare plants and frogs may not survive; they might become extinct. Rice farming requires a lot of water. The farming company has to keep the rice fields wet all year round. To do this, the company must take water from the river. This affects the entire river ecosystem, especially during the summer dry season. Any pesticides or fertilizers used by Allied Grains easily could end up in the river and cause chemical pollution of the land and water.

SEASIDE ESTATES HOUSING DEVELOPMENT

What Is There Now
The Barletta Ranch is on three miles of coastal land in central California. The ranch owners raise cattle and sheep. The ranch also provides habitat for wild plants and animals. These include coyotes, gophers, gopher snakes, turkey vultures, and several kinds of rare plants.

The Proposed Change
The Barletta family wants to divide their land. In one area, they want to build a few expensive houses with a view of the ocean. Lots of open land will surround each house. They plan to sell these houses to wealthy people as retirement or vacation homes.

Some Points in Favor of the Proposed Change
The Barletta family owns this land. They should be able to do whatever they want with it. It is only fair for them to make money from selling houses on their own land. There will not be many homes, so only limited number of people will move to the area. The impact will be low. The Barletta have ranched this land for a long time. It is not natural habitat.

Some Points Against the Proposed Change
This ranch provides a place for many plants and animals to live. Although people have changed the land, it is important habitat. California's plants and animals need more land, not less. Now, everyone who drives along this coastline enjoys seeing the ocean. Building big houses will ruin the view for most people. If the Barlettas have to build houses, it would be better for the community to build smaller, lower-cost homes than would serve more people.

BONANZA COMPUTER CORPORATION PLANT

What Is There Now
The Arrango family owns ranchland in northern California. They raise cattle and sheep. The ranch is mostly grassland, which is good for grazing. Some oak and pine trees grow there, and the area supports wild foxes, coyotes, rabbits, snakes, and lizards. Many kinds of insects live there too.

The Proposed Change
The Bonanza Computer Corporation is offering to buy a piece of the Arrangos' land. They plan to build a computer manufacturing plant. They will hire workers from the area to help build the plant. Later they will provide jobs building computers.

Some Points in Favor of the Proposed Change
The computer plant will provide jobs for 375 people from nearby towns. Unemployment is a big problem in this region; the new jobs will help many families. The Bonanza Computer Corporation will pay county taxes. This income will help the county government do more for the community.

Some Points Against the Proposed Change
Paving and building on the ranch land would destroy the plants currently living there. Lack of plants affects the animals in the area. They will have to move away to find food. Some animals might die. It takes a lot of water to build computers. The plant will affect water resources in the area. Pollutants from the plant are also a problem. Some of the waste products created in building computers are poisonous. The poisons could get into the soil and water. Having 375 people working in the same place will create more traffic than the small country roads in the area can handle.

ROBERTS MINING COMPANY EXPANSION

What Is There Now
The Roberts Mining Company owns land in the southern California desert. They mine several types of ore. Their property is next to federal land. Campers, horseback riders, and off-road vehicle drivers enjoy using these public lands. Coyotes, bobcats, and foxes live in the area. So do desert tortoises, skunks, and rattlesnakes. The rare desert orchid is one of many kinds of desert plants that live there too.

The Proposed Change
The Roberts Mining Company wants to purchase mining rights on the federal land. They believe there are valuable minerals under the land. When they begin mining, they would fence off the area. It would not be safe for people to use the land for recreation.

Some Points in Favor of the Proposed Change
People use minerals every day. Many products depend on minerals. If people are going to have cars, computers, and DVD players, mining is necessary. The Roberts Mining Company has run the mines next to this land for a long time. They rarely have accidents. They do their best to limit environmental impact. The mines do not last forever. In about 50 years, the government can reopen the land for public use. Considering how important minerals are to society, this is a small price to pay.

Some Points Against the Proposed Change
The federal government owns this land. It is public property. The public should be able to use it. The Roberts Mining Company will keep people off the land. They will be making money on land they do not own. In addition, mining will disrupt the land. The plants and animals living there probably will not survive the mining operation. People should conserve more rather than mine more.

SWIFT RIVER GRAVEL COMPANY EXPANSION

What Is There Now
The Swift River Gravel Company owns land near the Swift River. They have mined gravel there for over 40 years. Now, they are running out of gravel. The company owns another site closer to the river. That land is forested. It provides habitat for many animals, including raccoons, bears, bats, and birds. The trees shade the river, which makes it cool enough for trout and salmon.

The Proposed Change
The Swift River Gravel Company wants to start mining on their new site. They plan to clear the trees and begin digging a gravel pit so they can continue to stay in business.

Some Points in Favor of the Proposed Change
Builders use concrete for buildings, roads, and many other projects. It is a necessary part of modern society. Gravel must be mined somewhere. Swift River Gravel Company has owned this land for a long time. They have always planned to mine gravel at this site. It is not fair to the company to stop them after they paid for the land. Current laws limit the amount and type of gravel mining. Swift River Gravel Company is within the laws controlling their new site. If Swift River goes out of business, 75 people will lose their jobs.

Some Points Against the Proposed Change
Mining laws do not go far enough. Even when companies follow the laws, mining creates noise and pollution. People living near the existing gravel pit are tired of the noise and danger caused by gravel trucks. They want to see the mine closed. They are worried about the effects of the new gravel mine on the river. Mining produces small soil particles that will end up in the water. Cutting the trees along the river will affect the temperature and quality of the water. This will affect the fish and other plants and animals that live in the river.

BIG MOUNTAIN SKI RESORT

What Is There Now
Big Mountain is in the Central Sierra National Forest. Pine trees cover the mountain. Every summer, hundreds of people hike and ride horses on Big Mountain. Many also camp at Trout Lake on the eastern side of the mountain. Trout and two kinds of frogs live in the lake. The area is also home to mountain lions, bears, coyotes, squirrels, chipmunks, and birds. Some people think there may be wolverines in the area. Nobody is certain about seeing one for many years.

The Proposed Change
The North American Ski Corporation wants to build a large ski area on Big Mountain. The project includes ski runs on both the western and eastern sides of the mountain. The company will build a ski lodge at Trout Lake. They will also add a lodge and parking lot at the base of the mountain. During winter, skiers will fill the mountain. In summer, tourists and mountain bikers will enjoy the area. The project requires removing one-quarter of the trees on the mountain.

Some Points in Favor of the Proposed Change
Several hundred people use Big Mountain each year now. When the project is finished, many thousands will be able to enjoy the beautiful scenery each year. Building the ski resort will create 200 construction jobs. There will be 100 new jobs at the resort. Area restaurants and shops will benefit from the increased number of tourists. The resort will bring in a lot of tax money.

Some Points Against the Proposed Change
Cutting down one-quarter of the trees on the mountain will be a major change in the natural environment. This will affect many plants and animals. People come to the mountain because it is beautiful and peaceful. This will change too. Thousands more vehicles will bring smog, air and water pollution, and crowding to the small towns in the area.

ROCKY ROAD OFF-ROAD VEHICLE PARK

What Is There Now
Grasses and shrubs cover this county-owned land. Until 15 years ago, small herds of sheep and cattle grazed on these coastal hills. Native plants and animals have moved back to the area. Coyotes, bobcats, and rattlesnakes live there now. Hikers use the few hillside trails.

The Proposed Change
The Recreational Vehicle Association wants the county to turn this land into a hillside park. The park will be an area where off-road vehicle drivers, dirt bikers, and mountain bikers can enjoy their sports. The Association expects several hundred people to use the park every weekend.

Some Points in Favor of the Proposed Change
This hillside area is not well used. Only a few hikers use the trails. People who want to go dirt biking, mountain biking, and driving off-road vehicles need a place to participate in these activities. There is no area in the county for these popular sports. Some people use private property and state park lands. This is illegal and the county is concerned about it. The Vehicle Association believes providing a special place for these sports will stop the illegal activities.

Some Points Against the Proposed Change
Driving off-road vehicles and dirt bikes harms plants and animals. Even mountain biking can cause ecosystem damage. Using the trails and roads causes soil erosion. In other areas that allow off-road sports, the trails are over-used. As the trails and roads develop deep ruts, people tend to move onto new areas. This causes further damage to the environment.

ORCHARD LANE SHOPPING MALL

What Is There Now
Orchard Lane is a small road in a fruit-growing area of the Central Valley. It is about three miles outside of Valley City. Fruit orchards line both sides of the road. The orchards are 75 years old, and they no longer produce much fruit. The orchards do not provide much habitat for wild species. Crows, magpies, and other birds often feed on the fruit.

The Proposed Change
The Miller Development Company wants to build a shopping mall on the old orchard land. The mall would serve people from Valley City and the nearby small towns. There are no other malls within 50 miles.

Some Points in Favor of the Proposed Change
Valley City does not have a shopping mall. For some products, Valley City residents have to drive 50 miles to a larger town. Building a shopping mall would save gasoline and reduce air pollution. People would also save money because local merchants have to charge higher prices than do big chain stores. Building a mall would provide construction jobs. Later, the mall would hire area residents to work in the stores. The mall would also provide tax money for the local economy.

Some Points Against the Proposed Change
People need food; they do not need a mall. A shopping mall will hurt local businesses in Valley City and other near-by towns. The mall will require paving over a lot of land. Rainwater will not be able to seep into the soil. Instead, it will flow over the pavement, picking up pollutants from the parking lots. Replanting the orchards with a different crop would be a more productive use of this farmland.

DOWNTOWN PLAZA SHOPPING CENTER

What Is There Now
The lot on the corner of Fourth Avenue and Williams Street is vacant. Many grasses and weeds grow there. There are many insects and an occasional neighborhood cat or squirrel. During the day, children sometimes play in the lot. They enjoy picking wildflowers and watching bugs. At night, homeless people sometimes sleep in the lot.

The Proposed Change
The Downtown Development Corporation wants to build a shopping center. The stores would carry popular styles of clothing. A neighborhood group wants to create a community garden and playground on the lot.

Some Points in Favor of the Proposed Change
The shopping center will bring much needed tax money to the city. Many unemployed people live in the city. The shopping center would provide new jobs. It would also allow people to shop near their homes and support local merchants. They would save time and gasoline because they would not have to shop at the mall outside of town.

Some Points Against the Proposed Change
A community garden gives people a place to grow their own food. This is helpful to families who live in apartments. Garden-grown fruits and vegetables are healthier, better tasting, and cheaper than store-bought varieties. Many children already play in this lot. Building a playground will make it a friendly and safe place for families. The garden and playground will help stop homeless people from sleeping in this area.

MOUNTAIN FREEWAY

What Is There Now
An old two-lane road leads across the mountains in this northern California region. It is the only available road in the area. It closes in winter because of snow. Drivers often see deer, bears, marmots, squirrels, and other forest animals near the road. Trout and several kinds of frogs and salamanders live in the roadside creeks. On occasion, people see mountain lions and bobcats.

The Proposed Change
Politicians and business leaders want to expand the road. They want to build a six-lane freeway through a pass in the mountains.

Some Points in Favor of the Proposed Change
People who live in this mountain area want an easier, faster, and safer way to get to the Central Valley. They want a more direct route to Highway 5, which runs all the way up and down California. A larger road will help truckers. It will save them time, fuel, and money. A freeway will bring more business to the small, struggling mountain towns in the area. It might encourage people to move to the area. With a better road system, local land values will increase. More jobs and tax money will come to the area.

Some Points Against the Proposed Change
Building a six-lane freeway will destroy the surrounding habitat. Many animals that live in the areas will lose their homes. The road will cut through the hunting territories of some predators. These animals will have a hard time finding enough food. It will be dangerous for them to cross the road. Cars and trucks traveling at high speeds will likely strike some animals. These accidents might also injure some motorists. Easier travel could also lead to the growth of the small towns in the area. Then, the small town atmosphere that makes people want to live here will change. Growing towns mean even more loss of land.

Name: _____

Persuasive Essay Peer & Teacher Evaluation (Lesson 6 Activity Master)

Does the essay:	Peer Evaluation	Teacher Evaluation
Have an interesting headline?	__4 __3 __2 __1	__4 __3 __2 __1
Provide a description of the purposed land use change?	__4 __3 __2 __1	__4 __3 __2 __1
Identify what resources would be affected and the quantities affected?	__4 __3 __2 __1	__4 __3 __2 __1
Identify what populations of organisms would be affected and how?	__4 __3 __2 __1	__4 __3 __2 __1
Describe why those organisms are important to the energy flow in the natural ecosystem?	__4 __3 __2 __1	__4 __3 __2 __1
Identify the function of the affected organisms in the ecosystem?	__4 __3 __2 __1	__4 __3 __2 __1
Clearly state a position, either for or against the proposed change?	__4 __3 __2 __1	__4 __3 __2 __1
Explain why people should agree with your position?	__4 __3 __2 __1	__4 __3 __2 __1
Include any quotations or realistic details, and did they add to the article?	__4 __3 __2 __1	__4 __3 __2 __1
Did you check the essay for:		
Grammar, word use, punctuation, spelling?	__4 __3 __2 __1	__4 __3 __2 __1
Overall apparent effort and neatness?	__4 __3 __2 __1	__4 __3 __2 __1
Did you check the article for:		
	__4 __3 __2 __1	__4 __3 __2 __1

Unit Visual Aids

Wolverine in Its Habitat (Lesson 1 Visual Aid)

Classroom Populations (Lesson 1 Visual Aid)

Which are populations in this classroom?

Highlight or underline all that apply.

Children	**Frogs**	**Books**
Girls	**Chairs**	**Plants**
Boys	**Students**	**Humans**

Populations in Nature (Lesson 1 Visual Aid)

What populations are shown here?

Populations in Nature (Lesson 1 Visual Aid)

What populations are shown here?

Making a Living #1 (Lesson 2 Visual Aid)

Role or Function

Producer: _____

Consumer (herbivores): _____

Consumer (carnivores): _____

Consumer (omnivores): _____

Consumer (scavengers): _____

Decomposers: _____

Making a Living #2 (Lesson 2 Visual Aid)

Role or Function

Producer: _____

Consumer (herbivores): _____

Consumer (carnivores): _____

Consumer (omnivores): _____

Consumer (scavengers): _____

Decomposers: _____

Organisms and Their Functions (Lesson 2 Visual Aid)

Match the description of the organism's function at the left with the term at the right. Use each term only once.

Description of Function	Organism
____ **1.** An organism that gets its energy and materials by breaking down the remains of dead organisms and absorbing the nutrients	**a. bacteria**
____ **2.** An organism whose primary food source is plants	**b. carnivore**
____ **3.** An organism such as a plant or alga that uses light energy or chemical energy to produce food (sugars or starches)	**c. consumer**
____ **4.** A one-celled organism with no nucleus	**d. decomposer**
____ **5.** An organism that eats both plants and animals	**e. herbivore**
____ **6.** An organism that obtains energy and materials by eating other organisms	**f. omnivore**
____ **7.** An organism whose primary food source is other animals.	**g. producer**

Steps in the Energy Pyramid (Lesson 3 Visual Aid)

Sierra Nevada Mountains Ecosystem Organism

Narrator

Steps in the Energy Pyramid (Lesson 3 Visual Aid)

Sierra Nevada Mountains Ecosystem Organism

Sun

Steps in the Energy Pyramid (Lesson 3 Visual Aid)

Sierra Nevada Mountains Ecosystem Organism

Grass

Producer

Steps in the Energy Pyramid (Lesson 3 Visual Aid)

Sierra Nevada Mountains Ecosystem Organism

Rabbit

Primary Consumer

Steps in the Energy Pyramid (Lesson 3 Visual Aid)

Sierra Nevada Mountains Ecosystem Organism

Coyote

Secondary Consumer

Steps in the Energy Pyramid (Lesson 3 Visual Aid)

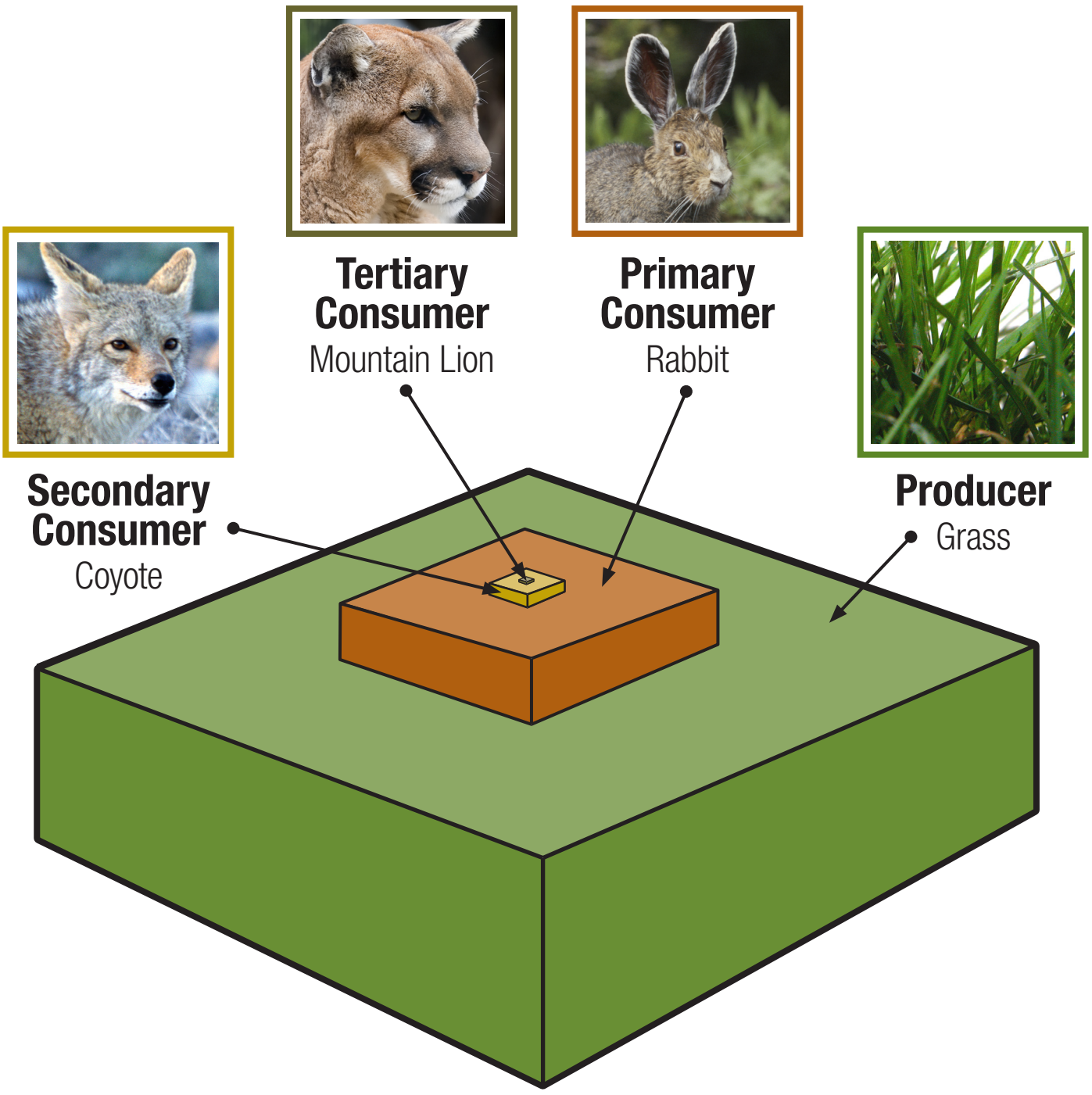
Sierra Nevada Mountains Ecosystem Organism

Mountain Lion

Tertiary Consumer

Mountain Lion Energy Pyramid (Lesson 3 Visual Aid)

90% Energy Loss at Each Trophic Level



Before & After (Lesson 4 Visual Aid)